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Patent Administrator
Testa Hurwitz & Thibeault LLP
125 High Street
Boston, MA 02110

EXAMINER
SODERQUIST, ARLEN

ART UNIT	PAPER NUMBER
1743	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/755,951	Vestal
Examiner	**Art Unit**
Arlen Soderquist	1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Dec 5, 2002*.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *75-98* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *75-98* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

1. Applicant is reminded of the continuing obligation under 37 CFR 1.56 to timely apprise the Office of any litigation information, or other prior or concurrent proceeding, involving Patent No. 5,498,545 or Reissue Patent RE37485, which is material to patentability of the claims under consideration in this reissue application. This obligation rests with each individual associated with the filing and prosecution of this application for reissue. See MPEP §§ 1404, 1442.01 and 1442.04.

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 75-89 and 92-96 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In claims 75, 92 and 95-96, the presence of a sample support holder for multiple sample supports in a lock chamber that does not include a separate sample chamber having the sample support holder therein is not supported by the original specification. In the figures there are two different embodiments shown for the vacuum lock. The first shown in figures 4-5 and 8 includes a storage chamber (60) having a sample storage cassette (80) for storage of a plurality of sample plates (10). The second shown in figures 6-7 is a simplified lock without the storage chamber or capability of storing a plurality of sample plates suitable for manually loading individual sample plates into the mass spectrometer. In papers filed April 5, 2001, April 12, 2002 and December 5, 2002, applicant points to figures 6-7 and 9 for support of claims 75 and 95-96 along with sections of columns 6 and 8-9 directed to the structure used to handle a plurality of sample plates. Relative to the support for a lock chamber without a separate sample chamber having the sample support holder therein examiner notes that column 6, lines 53-57, column 8, lines 21-28 and column 9 lines 39-49 are not describing figures 6-7 and fail to support a sample holder for a plurality of sample plates in the sample lock of figures 6-7. Relative to the description of column 9, lines 39-49, it is noted that a similar

description is found in column 7, lines 25-47 with respect to figures 4-5. While the cited section of column 9 does not teach how samples can be manually added the discussion in column 7 taken in conjunction with it clearly shows how the samples can be manually loaded into the system described in figure 8. This is evidence that the entire paragraph containing the section cited by applicant as supporting the above claims being solely directed to the embodiment shown in figure 8 and not generally directed to all of the embodiments shown in the figures. Relative to the cited section of column 6, the "manually operated sample loading door" for loading samples prepared off-line is described as element 70 of figure 4 (see column 7 lines 37-47). Thus column 6 lines 53-57 are describing a device that has a separate sample storage chamber to hold a plurality of sample plates. Similarly column 8 lines 21-28 is describing the embodiment of figure 4-5 and column 9 lines 39-49 is describing the embodiment of figure 8. In the embodiment of figures 6-7 the vacuum lock does not have the capability of storing a plurality of sample plates because it is intended to be used for manual insertion of individual sample plates (column 8, lines 29-33). The embodiment of figures 6-7 has a sample tray 99 which loads a single sample plate into the vacuum lock of the spectrometer (column 8, lines 44-48 and column 9, lines 3-14). Thus the embodiment of figures 6-7 cannot provide support for continuous fluid communication between the vacuum lock chamber and the ion source chamber during the full time that first and second sample plates are being disassociated, transported and associated. Additionally examiner was not able to find support for placing a storage cassette in the vacuum lock embodiment of figures 6-7. It should be pointed out that lines 38-45 of column 9 are describing figure 8 which has both a sample storage chamber and a vacuum lock chamber rather than figures 6-7 (see column 9 lines 22-39).

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 75-81 and 84-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beavis (US 5,288,644) in view of Wilhelmi (*Safeguards Tech., Proc. Symp.* or KFK-2319, EUR05504), Weinberger and Duffin. In the figures and associated discussion Beavis teaches a mass spectrometry instrument (30) and sample preparation device for determining the sequences of DNA molecules. Column 3, lines 19-23 teach that an objective of the device is to automate the analysis process. The sample preparation device includes an autosampler (10), matrix container (12) and sample containers (14) under the control of a computer (22). This instrument is used to prepare and analyze a plurality of samples by matrix-assisted desorption/ionization. In preparing a sample the autosampler mixes a sample with the matrix material and spots it (18) at a specific, known location on a disk (20) or other media having a planar surface relative to a reference mark (24) on the disk (column 4, line 53 to column 5 line 24). The known location of each spot is loaded into the computer (22). After spotting, the samples (18) are dried and inserted into the mass spectrometer through a vacuum lock (column 4, lines 63-67) which would have some form of door to allow the insertion of the sample into the lock and subsequently into the ion source of the spectrometer. Also inherent in a vacuum lock would be the removal of ambient atmosphere in the lock during the pumpdown phase to prevent exposure of the sampling region to the ambient atmosphere. Column 5 lines 20 - 28 teach the positional adjustment of the disk (20) within the spectrometer to allow the disk to be rotated so that each of the 120 samples on the disk can be measured. Column 5 lines 30 - 34 teach that the particular disk geometry is only exemplary and other geometries employing linear translation of the planar surface are also contemplated. Column 5 lines 35 - 45 teach maintaining the disk at a potential during ion

formation with a laser (32). Column 6, lines 26 - 33 teach the attenuation of the laser output. Column 4, lines 9 - 30 of the instant specification teaches various ways of providing the samples at fixed locations including just knowing the coordinates of the location which Beavis clearly teaches. Beavis fails to teach maintaining a second sample containing disk under vacuum conditions while the first is being struck with laser pulses, a curing chamber, identification means in the support, one or more samples in the vacuum lock during processing of one sample in the spectrometer, or magnetic means on the sample tray and transports for coupling during sample tray movement.

In the paper Wilhelmi discusses an automatic analytical laboratory for mass-spectrometric isotopic-dilution analysis of uranium and plutonium in fuel solutions. The individual basic processes, i.e., sampling, spiking, and chemical processing of the samples, mass-spectrometric measurement and calculation of the analytical data, are automated independently. Experience obtained over 4 years of manual processing and measurement of several hundreds of samples caused the conversion to automation. The different process steps required for sampling, spiking, and chemical processing of the samples are implemented by components which are combined by a unit-construction system. For the mass-spectrometric measurements commercial equipment was automated. The sample throughput of this equipment is to be increased to 48 measurements per day by a high-vacuum lock system for preheating the samples. Further commercial equipment is used to calculate the results of the analyses whose program is being developed. The concept and designing of the facility and the present state of development are reported. Relevant to the instant claims are figure 3 and its associated discussion. In the figure three separate lock chambers are shown. In the left chamber sample degassing occurs. The left chamber is connected to the middle chamber such that during the degassing the two chambers are isolated from each other. After degassing the two chambers are brought into fluid communication and the sample cassette with its plurality of samples is automatically transferred into the middle chamber. This chamber is directly connected to the ion source and figure 3 appears to show that there is fluid communication during the insertion of a sample into the ion source. After the analysis is finished the sample is returned to the cassette and the next sample is analyzed. When

the samples in a cassette have been analyzed the cassette is transferred to the right chamber in a manner similar to the first transfer. The first section of page 171 discusses the advantages of the automation including saving time and improving reproducibility.

In the report Wilhelmi (see the attached translation) describes a completely automated mass spectrometer in fissile material control. The demand for higher accuracy and a shorter delay in the analysis together with better data security needed in safeguards, lead to the automation of a mass spectrometer. Starting with the continuous feed of samples via a high vacuum lock and including the subsequent heating, focussing and scanning of the samples as well as the final evaluation of the data (taking α-spectrometry and the weights required for the isotropic dilution technique into account), the mass spectrometric procedure was completely automated. A serial CH-5 instrument of VARIAN MAT was modified to be operated by a VARIAN 620/I computer. A newly developed 3-chamber high vacuum lock was attached to this system and the final evaluation was made with an IBM 370. This was described in sections 2.3, 2.31, 4, 4.14.2, 5, 5.1 and figures 8-13. The system was used for the isotope analysis of U, Pu and Nd. Major breakdowns of the hardware did not occur, however, the computer programs had to be steadily improved according to the changing characteristics of the samples. Compared to manual operation, the automated technique is superior for the reasons given in section 5.4.

In the figures and associated discussion Weinberger teaches a laser desorption mass spectrometer and sample preparation device. Of particular interest to the instant application are figures 6, 6a and 14 teaching a drying chamber (320) to assist in drying the samples and means for storing and inserting multiple sample containing probes in a vacuum chamber connected to a vacuum chamber for the mass spectrometer ion source. In the vacuum chamber (28) a sample cassette (152) containing a plurality of sample probes (30,154) which has a magnetic or mechanical coupler (162) that interacts with a similar coupler (160) on the transporter device (159).

In the paper Duffin teaches an automated sample transport system for chromatography/secondary ion mass spectrometry. The design of a new sample cell for a large-scale secondary ion mass spectrometer is described. Unique to this new source chamber is

the incorporation of large piezoelectric translator stages capable of 20 cm × 20 cm movement with high resolution. In addition, the source chamber is designed so that interchangeable detector assemblies can be fitted to the chamber. The paragraph bridging pages 1072-1073 discusses previous sample manipulation stages using mechanical linkages from external drives or vacuum compatible stepper motors and how the piezoelectric translators do not have the disadvantages of heat control or loss of resolution due to gears. This translation stage allows controlled movement of the sample supports with a position reproducibility of 1μ.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a vacuum lock connection as taught by Wilhelmi into the Beavis device and method because as shown by Wilhelmi it would have allowed the sample preparation and analysis to occur under conditions that would have provided further advantages such as time and throughput related to automation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the sample cassette as taught by either Wilhelmi or Weinberger and transporter mechanism of Weinberger into the Beavis device because one of ordinary skill in the art would have recognized that having multiple sample trays in the sample chamber would allow the instrument to operate for extended periods of time without operator interaction and would facilitate movement of the sample trays into and out of the mass spectrometer as shown by both Weinberger and Wilhelmi. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a drying chamber as taught by Weinberger into the Beavis device because one of skill in the art would have recognized that the drying chamber would increase the preparation speed by reducing the time for the samples to dry. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the movement mechanism of Duffin into the Beavis device because of it ability to translate a sample support to position the support for vaporizing sample from multiple locations and its advantage over external drives and vacuum compatible drives as taught by Duffin.

6. Claims 82 is rejected under 35 U.S.C. § 103 as being unpatentable over Beavis in view of Wilhelmi, Weinberger and Duffin as applied to claim 81 above, and further in view of Ledford. Beavis does not teach indicia at each sample location.

In the patent Ledford teaches apparatus and method for injecting samples into a mass spectrometer. Column 2, line 56 to column 3, line 31 teach that the samples are deposited on a tape or rotatable disk which may be inserted into the ionization chamber through a vacuum lock mechanism. Also taught is mixing the sample with an easily vaporizable matrix material to enhance volatilization of nonvolatile or thermolabile samples (also see column 11, lines 5-21). Optical indicia are provides to give sample identification and sample position information (column 10, lines 50-68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include indicia as taught by Ledford at the sample positions of Beavis because of the ability to provide indexing and sample information as taught by Ledford.

7. Claim 83 is rejected under 35 U.S.C. § 103 as being unpatentable over Beavis in view of Wilhelmi, Weinberger and Duffin as applied to claim 75 above, and further in view of Bakker. Beavis does not teach a door member between the ion source chamber and the vacuum lock.

In the paper Bakker presents a direct-insertion sample-handling system for mass spectrometers. The direct-insertion lock was brazed to the side of the vacuum chamber of the mass spectrometer opposite the source. The stainless steel probe does not need an exceptionally high surface finish; machining to a fine finish followed by polishing with a linen mop is sufficient. The insertion lock is isolated from the source by a 1 inch quarter-swing butterfly valve (door). The whole assembly is made of stainless steel. Sealing is done with viton O-rings. The seals are so effective that differential pumping is no longer used. Sample introduction takes <1 minute, and at all times there is a positive control over the probe position. None of the source supplies had to be switched off during sample introduction.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the door (swinging valve) of Bakker between the vacuum lock and the ion source chamber as taught by Bakker in the device of Beavis because of the ability to rapidly introduce

samples into the ion source chamber under vacuum without switching off the ion source as taught by Bakker.

8. Applicant's arguments filed December 5, 2002 have been fully considered but they are not persuasive. Relative to the rejection under 35 USC 112 1st paragraph directed to the presence of a sample cassette in the vacuum lock chamber examiner refers applicant to the full paragraph of column 9, lines 19-51 and the disclosure found in column 7, lines 25-47. It is clear from lines 23-39 that the description of lines 39-49 are directed at figure 8 which has both a sample chamber and a lock chamber. In lines 23-39 it is also clear that the sample cassette is located in the sample chamber not the lock chamber unless the term lock chamber in lines 39-49 is referring the combination of the chambers which figure 8 references as elements 60 and 68. As further evidence of this the above cited disclosure in column 7 contains an equivalent disclosure with a clear description of how the manual addition of sample plates occurs. Thus it is clear that the manual addition of sample plates in the embodiment of figure 8 occurs in a manner similar to that of figure 7. It is also clear from the paragraph of column 9, lines 19-51 that the operation of figures 4-5 and 6-7 is similar except in the level of operator intervention (see lines 19-22). One can then properly ask what is the difference between the two embodiments which changes the level of operator intervention. The clear difference is that lack of a sample storage cassette that cen hold a plurality of sample plates. The embodiment of figures 4-5 reduces the level of operator involvement by adding a sample storage region having the capability of storing a plurality of sample plates while the embodiment of figures 6-7 is for adding individual sample plates to the mass spectrometer. This can be clearly seen from the following sections of the patent that are reproduced below with added emphasis: column 6, lines 61-66, column 7, lines 37-47, column 8, lines 29-52 and column 9 lines 3-18.

> " **The manual step involved in loading the sample plates may be eliminated by adding a sample storage region to the vacuum lock chamber of a mass spectrometer, as shown schematically in FIGS. 4 and 5.** This provision, when coupled with on-line sample loading, allows the system to be operated in a fully automatic, unattended mode."

> " **The sample storage chamber 60 is equipped with a manually operated door 70 through which a number of sample plates loaded with samples off-line can be**

introduced simultaneously. To load a set of samples, a "manual load" setting is selected on the computer 36. This causes the sample storage chamber 60 to be vented to atmosphere via vent valve 72, and allows the manual load door 70 to be opened. The samples are then loaded and the chamber evacuated. **The entire set of sample plates can now be analyzed automatically without further operator intervention.**"

" **A simplified version of the vacuum lock designed for use with remote sample storage chamber is shown schematically in FIGS. 6 and 7. This system is suitable for manually loading individual sample plates into the mass spectrometer without venting the mass spectrometer vacuum system.** Prior to loading a sample plate, it may be assumed that the output door 76A is closed, and the pumpout valve 82A is closed. The vent valve 72A is opened allowing the pressure in vacuum lock chamber 92 to be raised to that of the surrounding atmosphere while the vacuum pump 96A attached to the ion source chamber 97 maintains the ion source chamber under high vacuum. The input door 98 is then opened and the sample transport tray 99 is transported by its air cylinder 78B through the input door 98 to a point where it is accessible for loading. The sample plates 10 may be manually loaded into the sample transport tray 99. Under computer control following a command from the operator, the tray 99 containing a sample plate is retracted into the vacuum lock chamber 92 by air cylinder 78B, and the input door 98 is then closed. The vent valve 72A is then closed, and the pumpout valve 82A is opened and the pump 84A activated until the vacuum lock chamber 92 is sufficiently evacuated. When a satisfactory pressure has been reached (typically 50 milliliter), the output door 76A is opened."

" **To eject the sample plate and load a new one the process is reversed**. First the output door 76A is opened, and the transport cylinder 89A equipped with the electromagnet 102 is extended so that the electromagnet makes contact with the magnetic strip on the sample plate 10. The electromagnet is energized and the cylinder 89A retracted to move the sample plate from the ion source chamber 97 to the transport tray 99 in the vacuum lock chamber 92. The output door 76A is closed, the magnet 102 is de-energized, the input door 98 is opened, and the sample tray 99 extended so that the old sample plate can be removed by the operator and replaced with a new sample plate. **Except for this final step, the entire operation is accomplished entirely under control of computer 107 with no intervention from the operator except for selecting a "eject" setting on the computer to remove a sample, and an "operate" setting to load a new sample and begin the test.**"

Thus the specification does not support a structure such as figures 6-7 with a sample cassette for holding a plurality of sample plates. The only way in which the statements could possibly be interpreted to have the lock chamber include a sample cassette is if the lock chamber refers to the

combination of the two chambers (60,68) as shown in figures 4-5 and 8. This is not how the lock chamber language is being interpreted by examiner. If the claims were to be interpreted in this manner, then the part of the 112 1st paragraph rejection regarding the fluid communication between the lock chamber and the ion source chamber will be reapplied against the appropriate claims because of the change in interpretation of what constitutes the lock chamber.

Relative to the art rejection, examiner first points to the Beavis reference the sample disk (20) is rotated by a stepper motor (26) during the sample preparation and by another stepper motor (28) during analysis. Thus the disk (20) is separable from the stepper motor and the attachment of the disk to the stepper motor (28) constitutes association with a sample receiving stage since the disk is supported by some portion of the stepper motor/rod shown in the figures. Column 4 lines 63-65 teach the disk being inserted through a vacuum lock to place it in the ion source region of the mass spectrometer. Insertion of a new disk would require the removal of the measured disk which would constitute the disassociation step of the claims. Applicant has not provided any probative evidence to support the position that the disk is attached to the stepper motor outside of the mass spectrometer while figure 2 clearly shows the stepper motor having components that extent though the mass spectrometer wall and the disk being of a size that exceeds the diameter of the rod to which it attaches. Thus the attachment to the stepper motor occurs after insertion of the disk through the vacuum lock. This also means that the teachings of Beavis cover the dissociation and attachment of the sample support to the sample receiving stage. Since this aspect of the claims is taught by Beavis, it is not required for the secondary references to teach this aspect of the claims. The secondary references are capable of performing this action by virtue of the sample support being removably attached to the sample transport mechanism. Furthermore the claims lack specific structure for the sample support transfer mechanism and case law relative to automation of a manual activity is clearly relevant to the instant claims. In particular see *In re Venner*, 120 USPQ 192 (CCPA 1958) (to provide a mechanical or automatic means to replace manual activity which accomplishes the same result is within the skill of a routineer in the art).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose telephone number is (703) 308-3989. The examiner's schedule is variable between the hours of about 5:30 AM to about 5:00 PM on Monday through Thursday and alternate Fridays.

For communication by fax to the organization where this application or proceeding is assigned, (703) 305-7719 may be used for official, unofficial or draft papers. When using this number a call to alert the examiner would be appreciated. Numbers for faxing official papers are 703-872-9310 (before finals), 703-872-9311 (after-final), 703-305-7718, 703-305-5408 and 703-305-5433. The above fax numbers will generally allow the papers to be forwarded to the examiner in a timely manner.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Arlen Soderquist

January 22, 2003

ARLEN SODERQUIST
PRIMARY EXAMINER